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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------------|------------------|
| 09/955,178 | 09/19/2001 | Kenichi Aoyagi | 07481.0018 | 9413 |
| 7590 05/05/2004 Finnegan, Henderson, Farabow Garrett & Dunner, L.L.P. 1300 I Street, N.W. Washington, DC 20005-3315 | | | EXAMINER THOMPSON, CAMIE S | |
| | | | ART UNIT 1774 | PAPER NUMBER |

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/955,178 | AOYAGI ET AL. | |
| | Examiner | Art Unit | |
| | Camie S Thompson | 1774 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed February 9, 2004 have been acknowledged.
2. Examiner acknowledges amended claims 1, 3 and 5.
3. Examiner acknowledges newly added claim 14.
4. The rejection of claims 1-2 under 35 U.S.C. 103(a) as being obvious over Graf, U.S. Patent Number 5,653,331 in view of Krueger, U.S. Patent Number 5,085,928 is withdrawn due to applicant's amended claim 1 and argument.
5. The rejection of claims 3-10 and 12-13 under 35 U.S.C. 103(a) as being obvious over Graf, U.S. Patent Number 5,653,331 in view of JP 04-215599 is withdrawn due to applicant's amended claim 3 and argument.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-7, 11 and 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Horii et al., U.S. 5,916,682.

The Horii patent discloses a fiber reinforced plastic composite that can be used as a transport member (a robot arm), which is in a cantilever state and has at least one first layer containing a unidirectional reinforced carbon fiber oriented by -20° to $+20^{\circ}$ with respect to the longitudinal direction of the member and having a tensile elasticity of 500 to 100 GPa as per instant claims 1 and 13-14 (see column 1, lines 5-11, column 2, lines 1-56 and column 4, lines 1-44).

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Additionally, the reference discloses a second layer comprising a unidirectional reinforced fiber oriented by $+30^\circ$ to $+60^\circ$ or -30° to -60° with respect to the longitudinal direction of the member and having a tensile elasticity of 100 to 600 GPa as per instant claim 1 (see column 4, lines 1-58). The reference discloses that the carbon fiber reinforced composite can 1-20 layers. The reference discloses the straight layer (skin layer) as being cut usually 1 to 10 layers fibers oriented unidirectionally at -20° to $+20^\circ$ with respect to the longitudinal direction of the member) as per the instant claims (see column 6, lines 1-15). Also, the reference discloses an angle layer (core layer) that includes both negative and positive angle layers wherein the fiber is oriented unidirectionally at -30° to -60° with respect to the longitudinal direction of the member as per instant claims 3 and 4 (see column 4, lines 20-44). It is disclosed in column 2, lines 30-45 of the reference that the vibration-damping factor of the cantilever is usually 0.01 to 0.05 as per instant claims 1-2, 5 and 11. The expression $(T_s + T_c) \times 0.2 \leq T_s \leq (T_s + T_c) \times 0.4$ is inherent for the composite, as it would be for the Horii patent.

Claim Rejections - 35 USC § 103

7. Claims 1, 3-4, 6, 8-10 and 12 are rejected under 35 U.S.C. 103(a) as being obvious over Horii et al., U.S. Patent Number 5,916,682.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37

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CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

The Horii patent discloses a fiber reinforced plastic composite that can be used as a transport member (a robot arm), which is in a cantilever state and has at least one first layer containing a unidirectional reinforced carbon fiber oriented by -20° to $+20^{\circ}$ with respect to the longitudinal direction of the member and having a tensile elasticity of 500 to 100 GPa as per instant claim 1 (see column 1, lines 5-11, column 2, lines 1-56 and column 4, lines 1-44). Additionally, the reference discloses a second layer comprising a unidirectional reinforced fiber oriented by $+30^{\circ}$ to $+60^{\circ}$ or -30° to -60° with respect to the longitudinal direction of the member and having a tensile elasticity of 100 to 600 GPa as per instant claim 1 (see column 4, lines 1-58). The reference discloses that the carbon fiber reinforced composite can 1-20 layers. The reference discloses the straight layer (skin layer) as being cut usually 1 to 10 layers fibers oriented

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unidirectionally at -20° to $+20^{\circ}$ with respect to the longitudinal direction of the member) as per the instant claims (see column 6, lines 1-15). Also, the reference discloses an angle layer (core layer) that includes both negative and positive angle layers wherein the fiber is oriented unidirectionally at -30° to -60° with respect to the longitudinal direction of the member as per instant claims 3 and 4 (see column 4, lines 20-44).

The Horii reference does not disclose the bulk specific gravity of the core layer. The specific gravity affects the strain of the composite. However, this feature is optimizable. Discovery of optimal values of a result effective variable involves only routine skill in the art in re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art to have the bulk specific gravity of the core layer fall within the range of 0.03 to 1.7 in order to have a composite that resists large amounts of strain. Horii does not disclose the volume of the first and second layers in the skin layer or the third layer in the core layer as per instant claims 8-10. The volume of the first and second layers of the skin layer and the volume of the third layer in the core layer affect the strain of the composite. However, this feature is optimizable. Discovery of optimal values of a result effective variable involves only routine skill in the art in re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art to have the volume of the first and second layers of the skin be 20 to 10 vol% and 0 to 80 vol%, respectively and the volume of the third layer in the core layer be 0 to 20 vol% in order to have a composite that can withstand strain.

Response to Arguments

8. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (571) 272-1530. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly, can be reached at (571) 272-1526. The fax phone number for the Group is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CYNTHIA H. KELLY
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